

Fig.1

FLUORESCENT SUBSTANCE	RESPONSE SPEED	LUMINOUS INTENSITY
P47	×	○
GaN ILLUMINANT	×	○
GaAsP ILLUMINANT	○	△

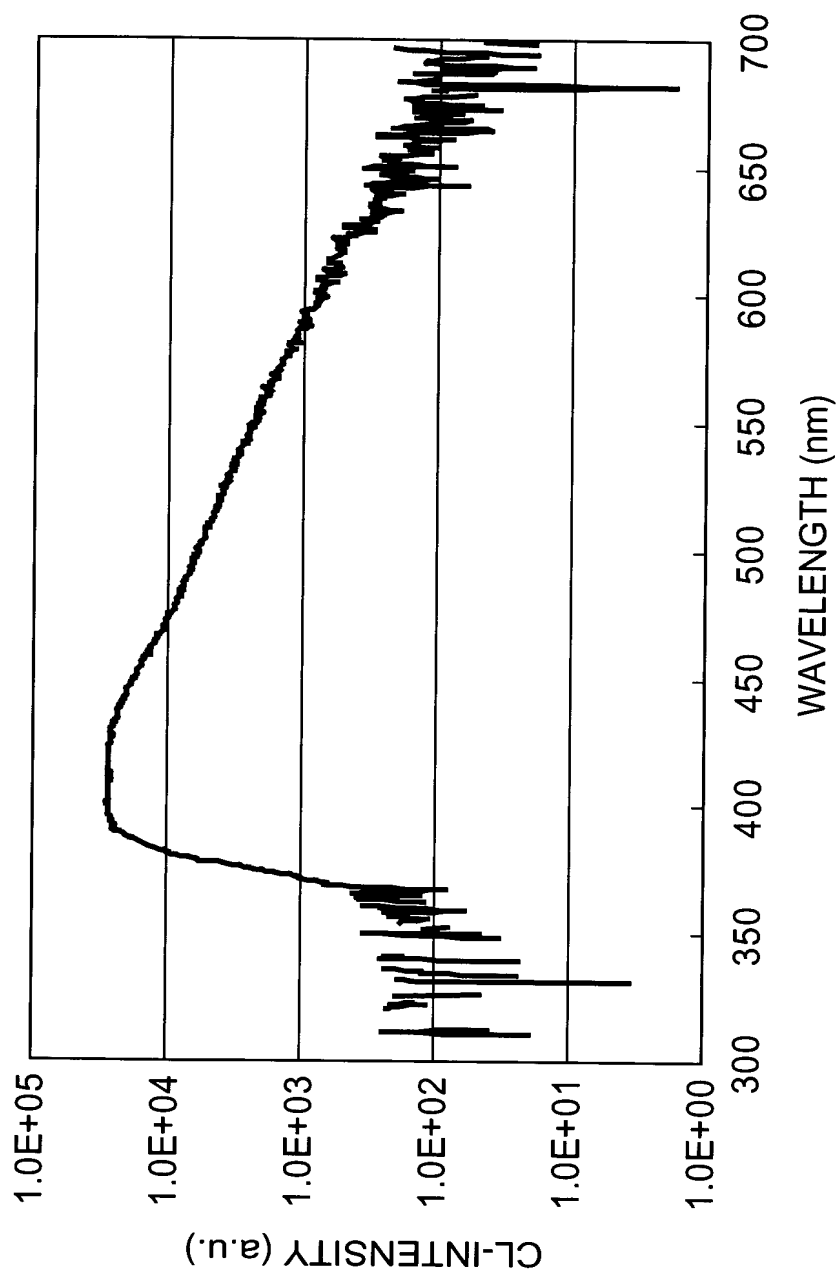
Fig.2

Fig.3A

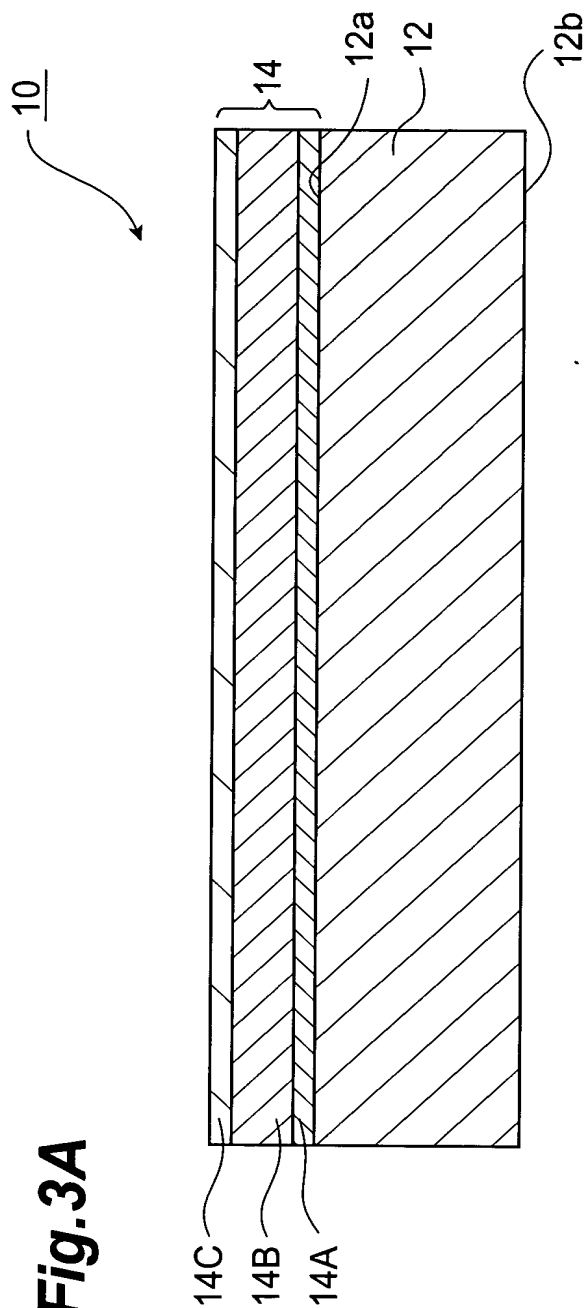


Fig.3B

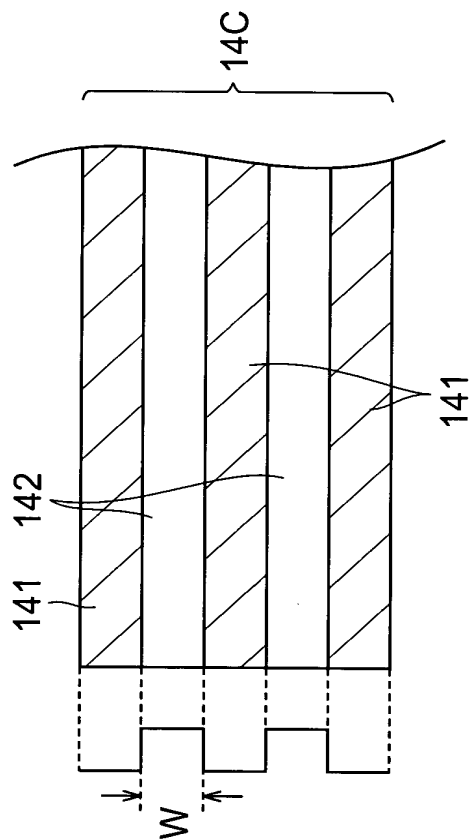
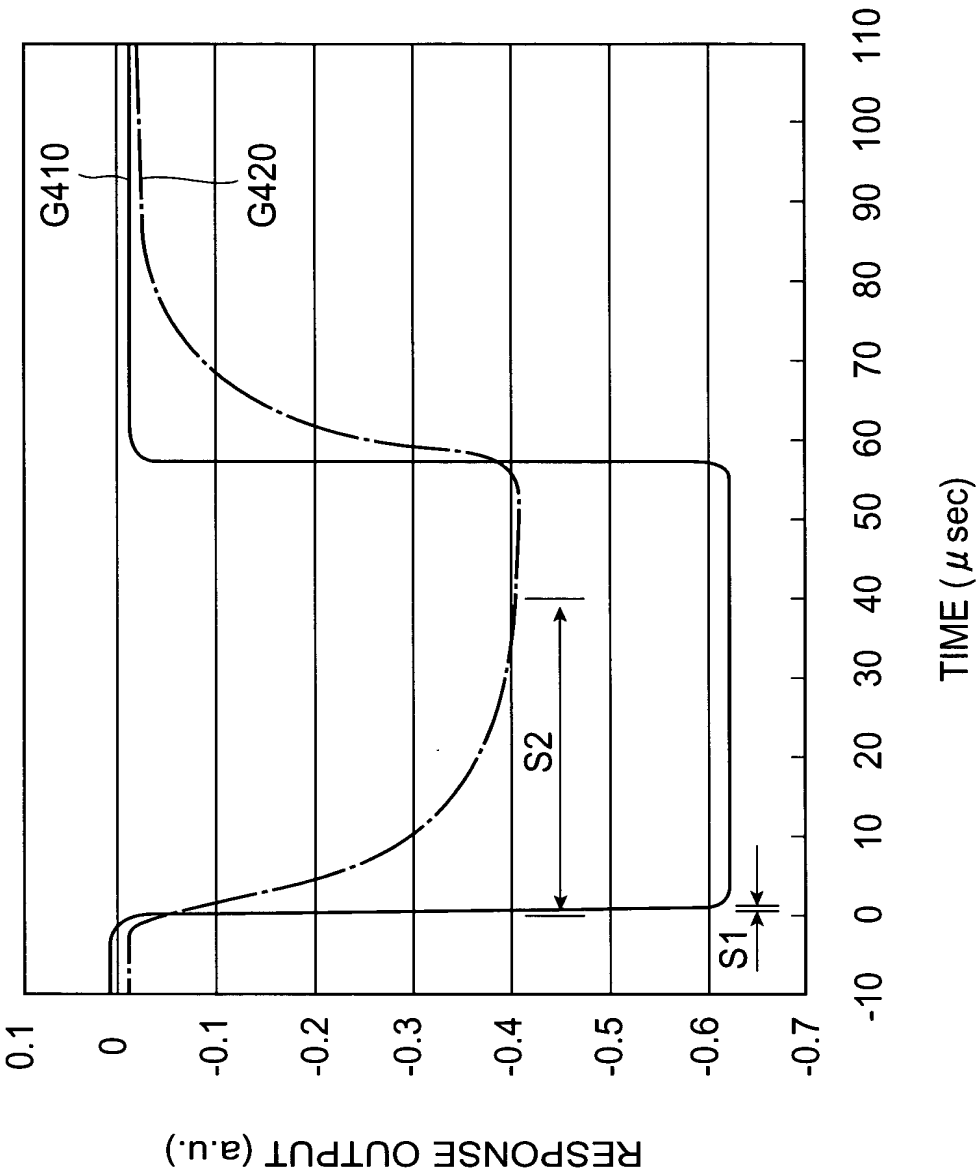
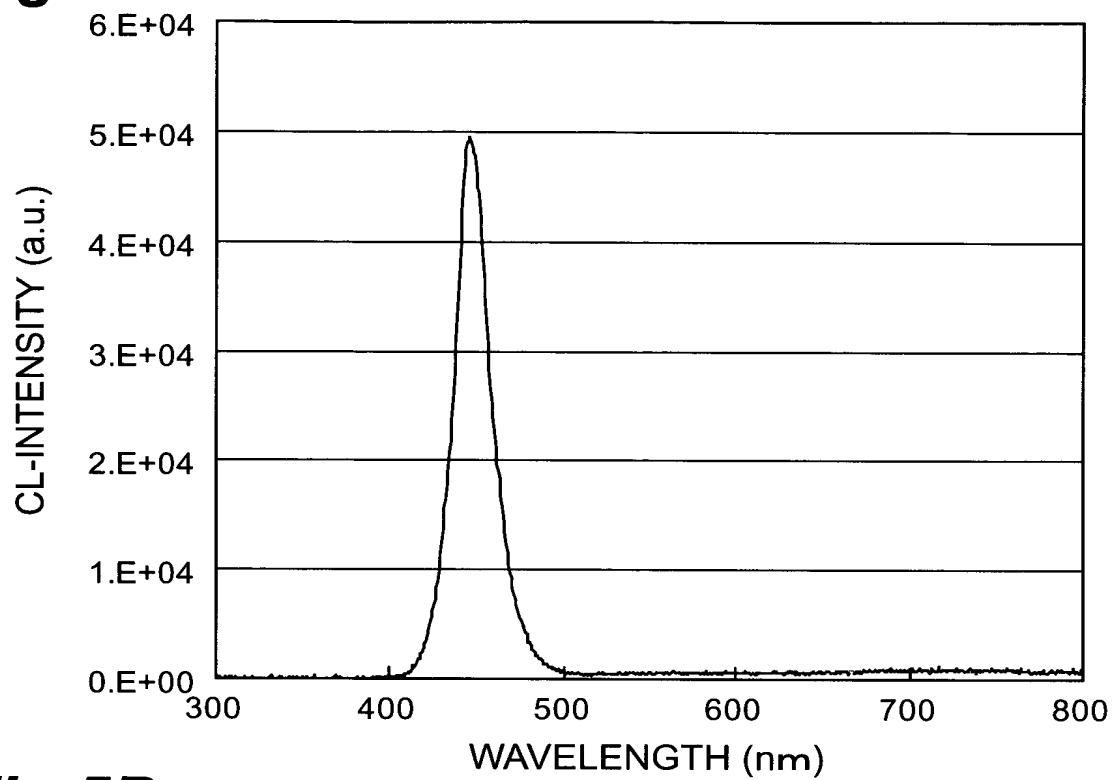
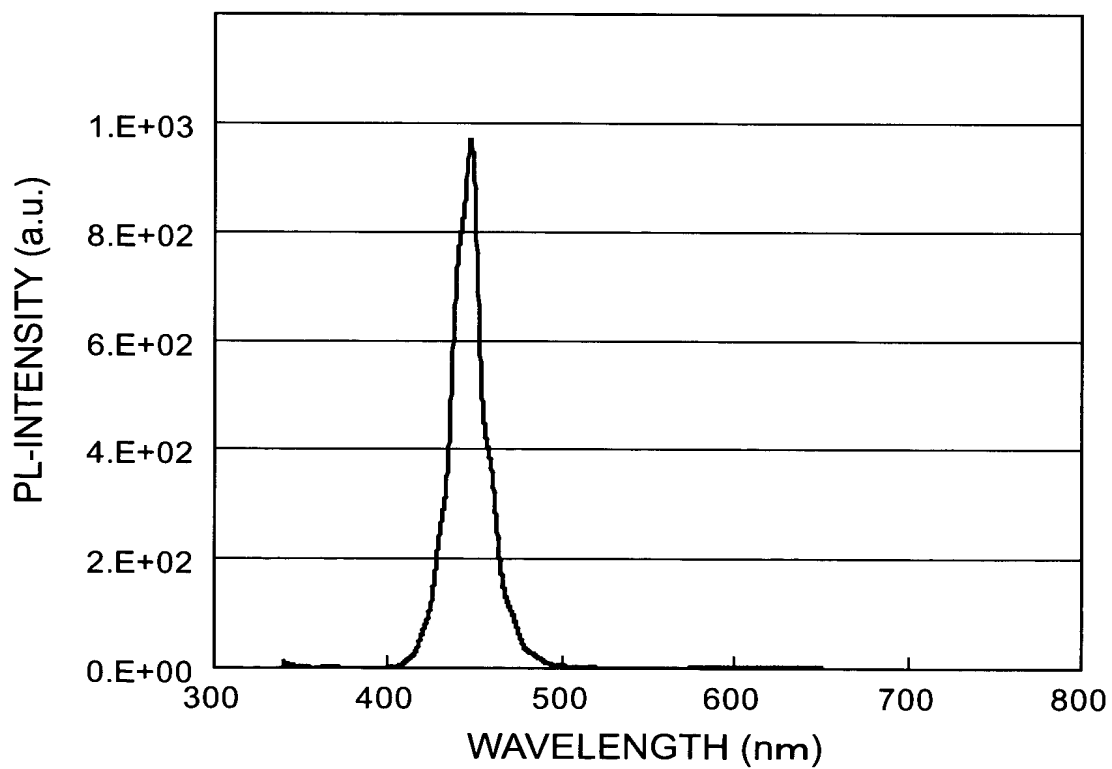


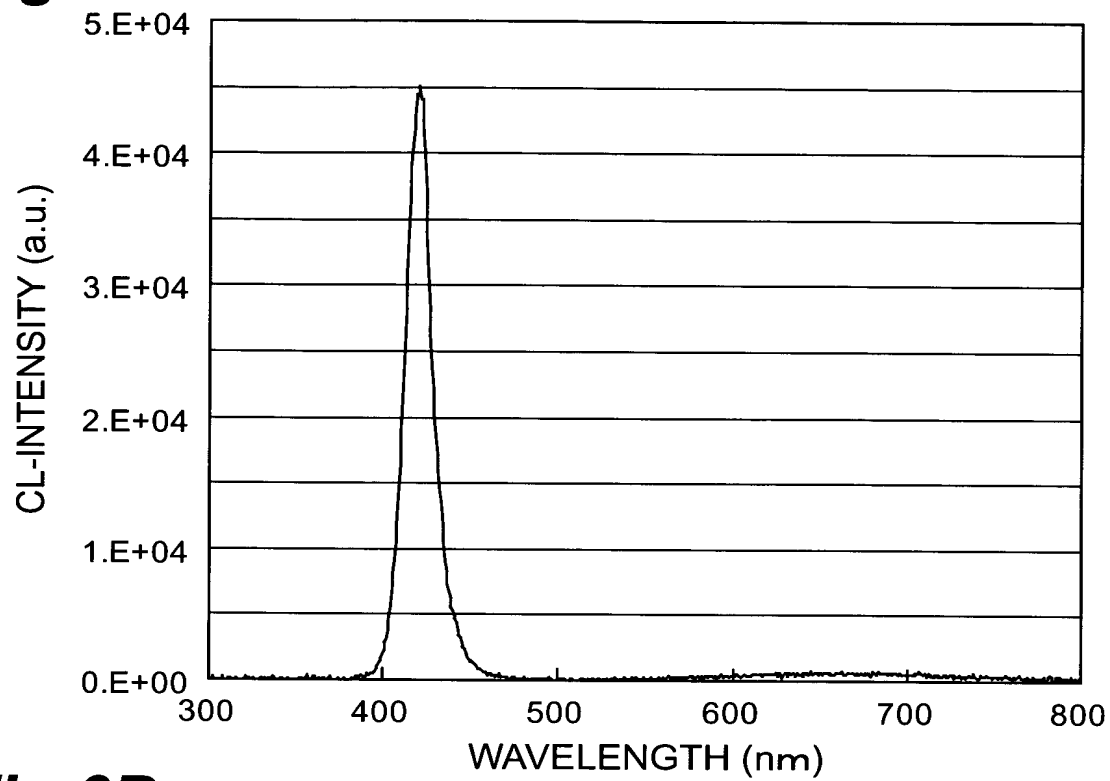
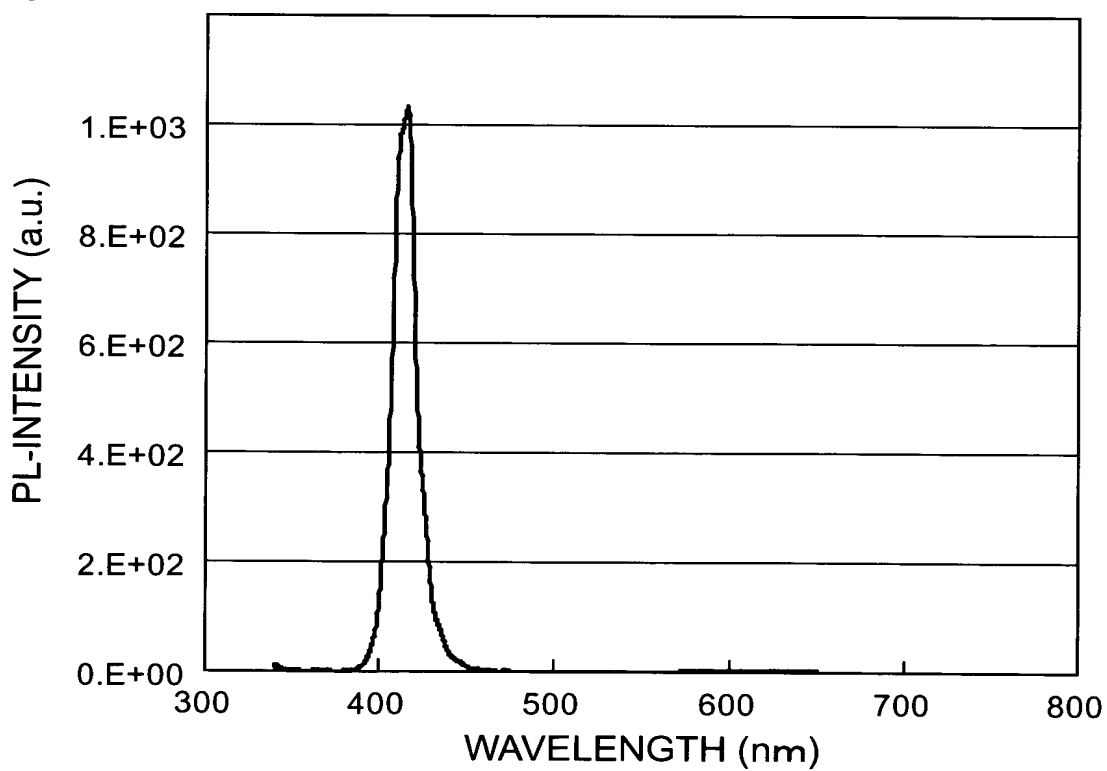
Fig.4



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Fig.5A**Fig.5B**

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Fig.6A**Fig.6B**

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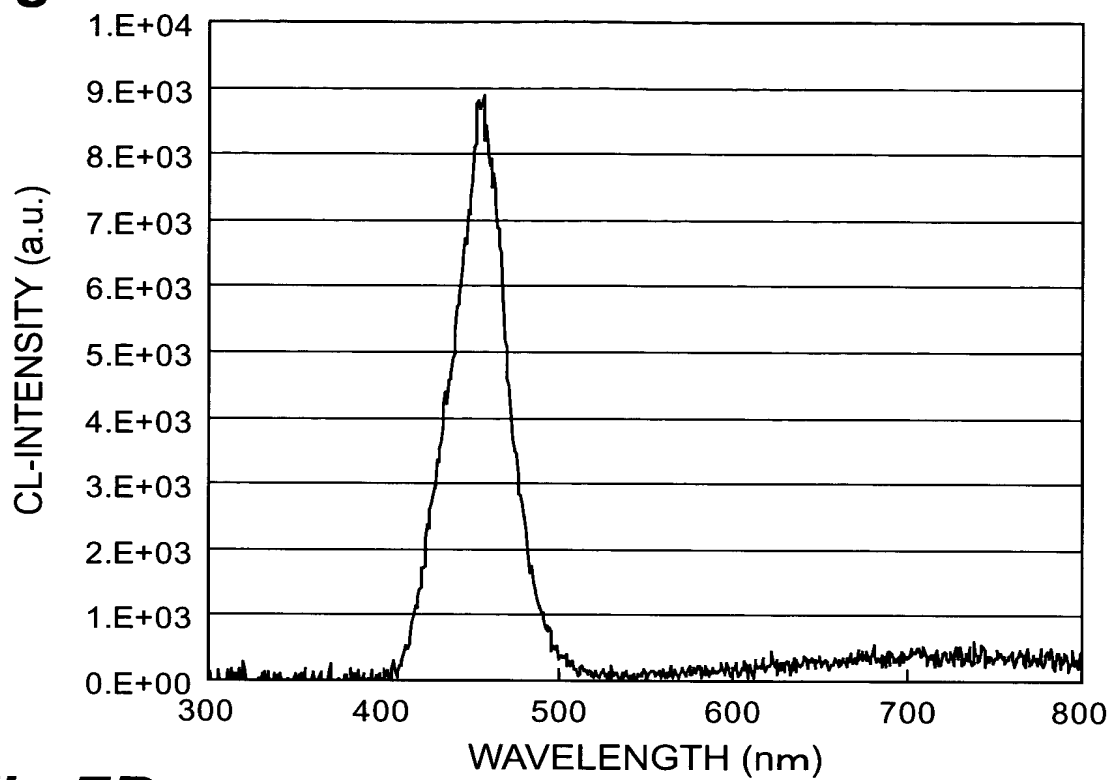
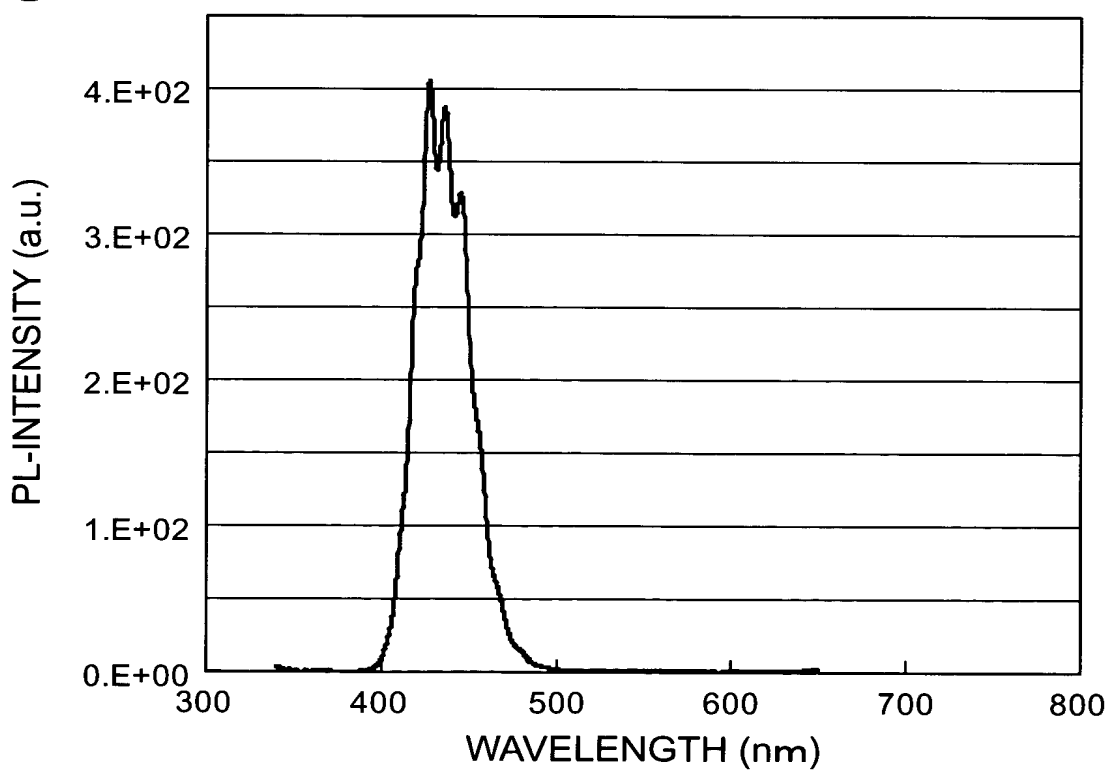
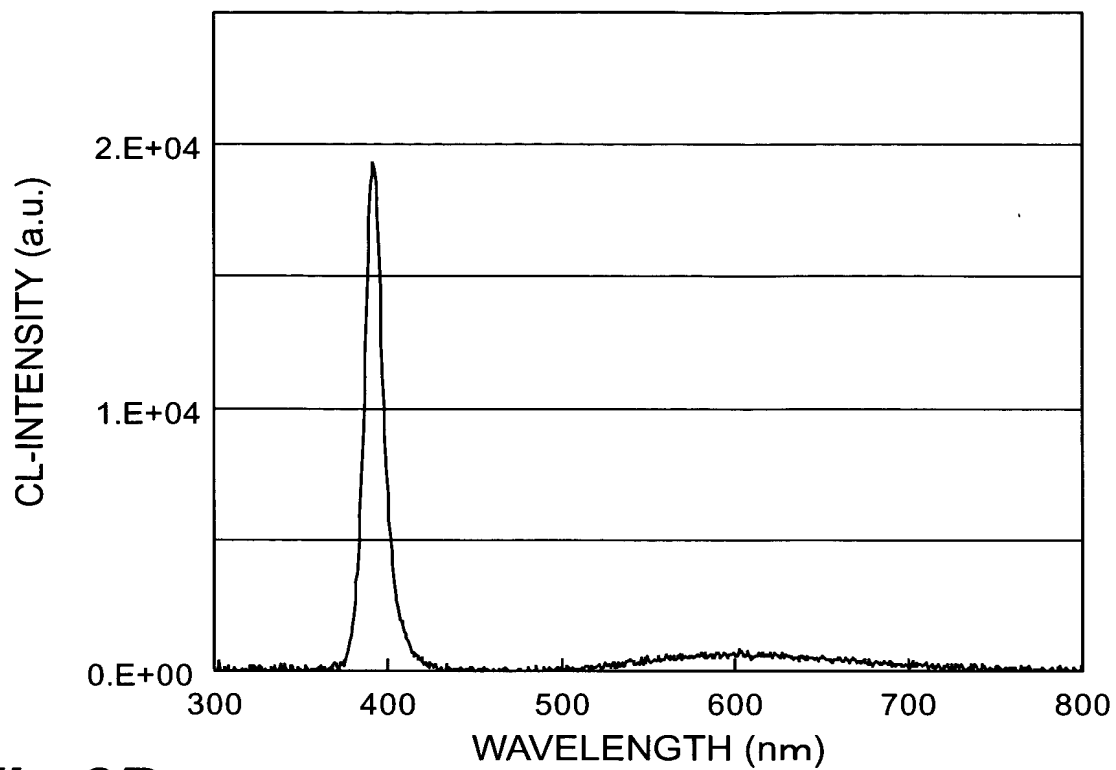
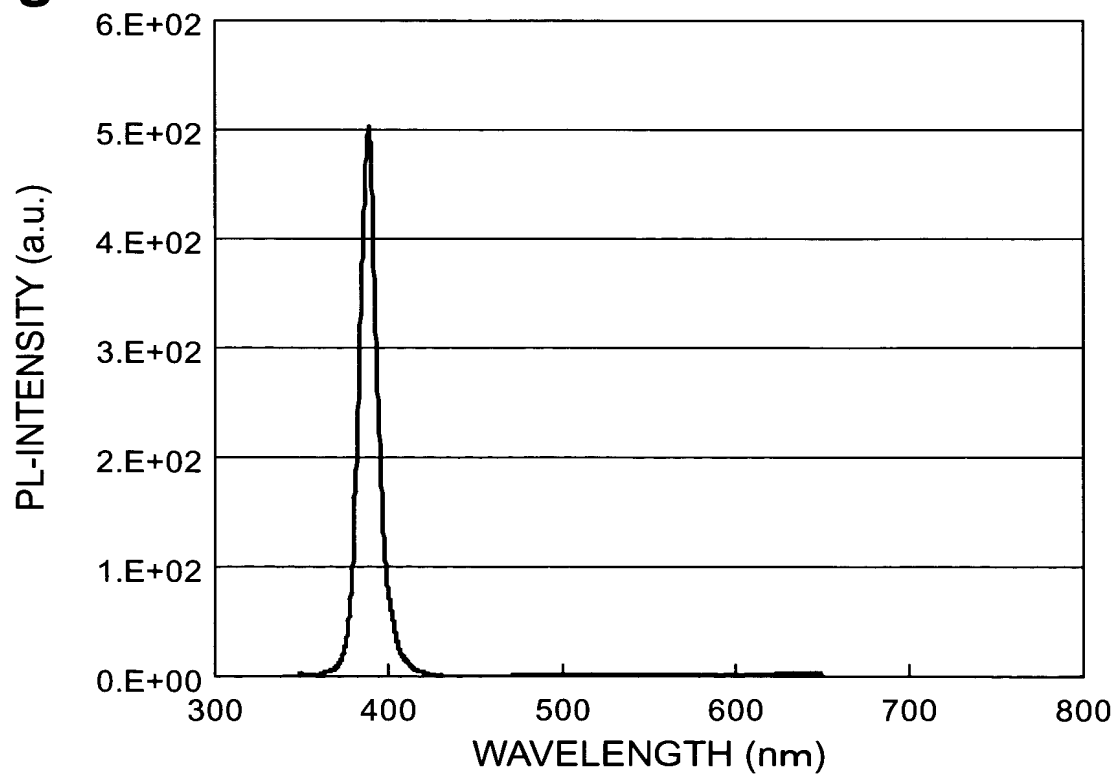
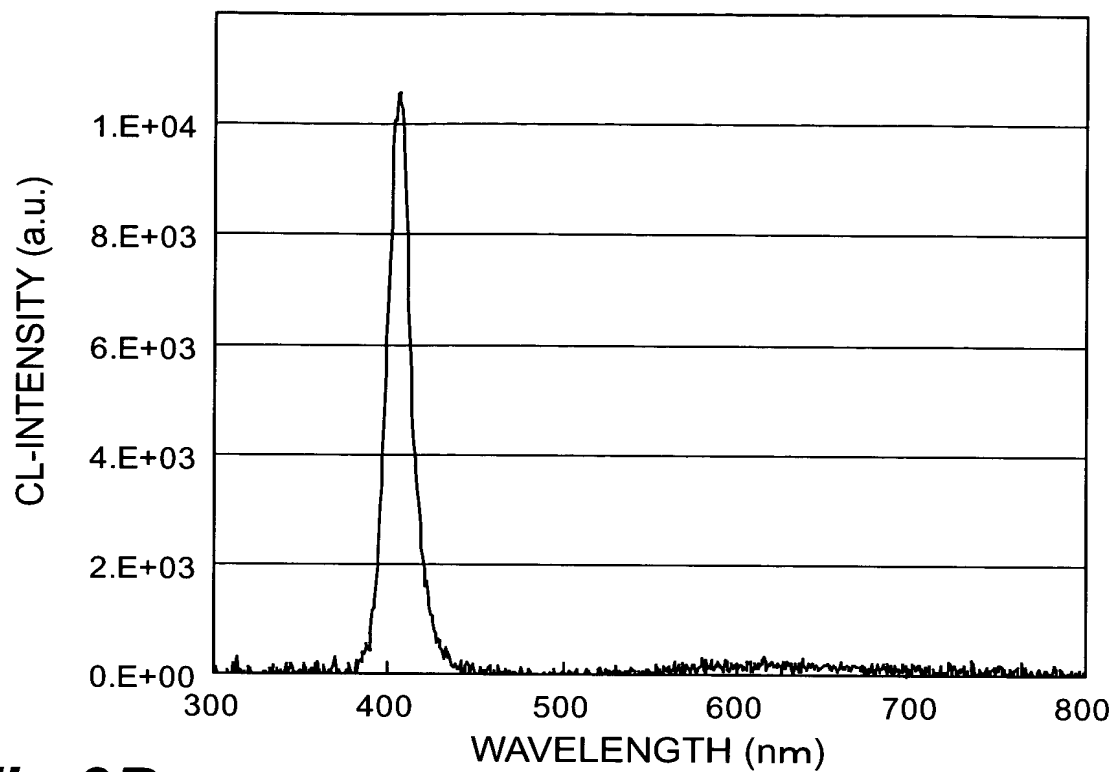
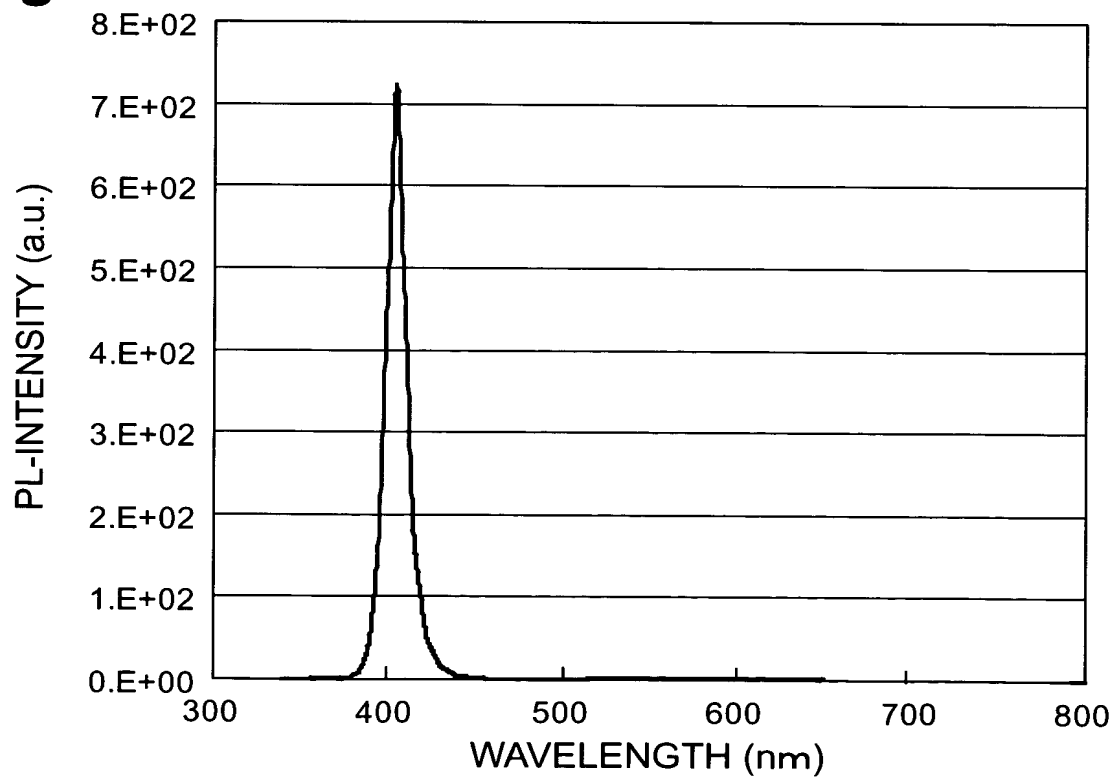
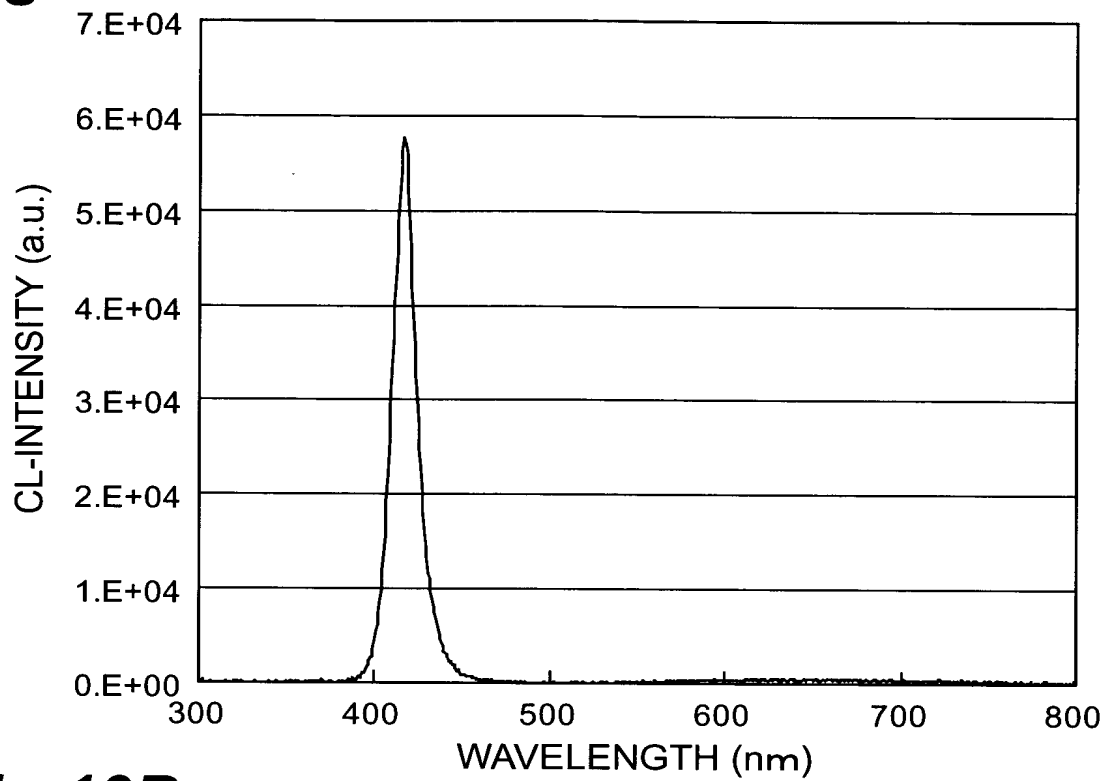
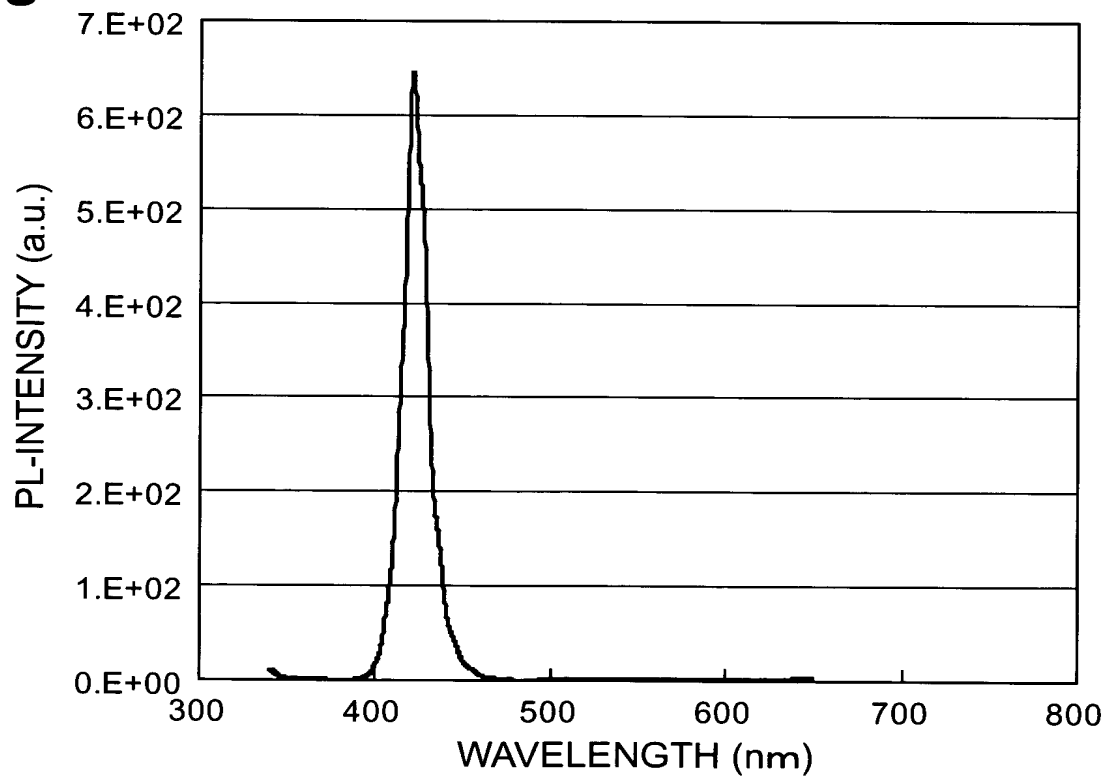
Fig.7A**Fig.7B**

Fig.8A**Fig.8B**

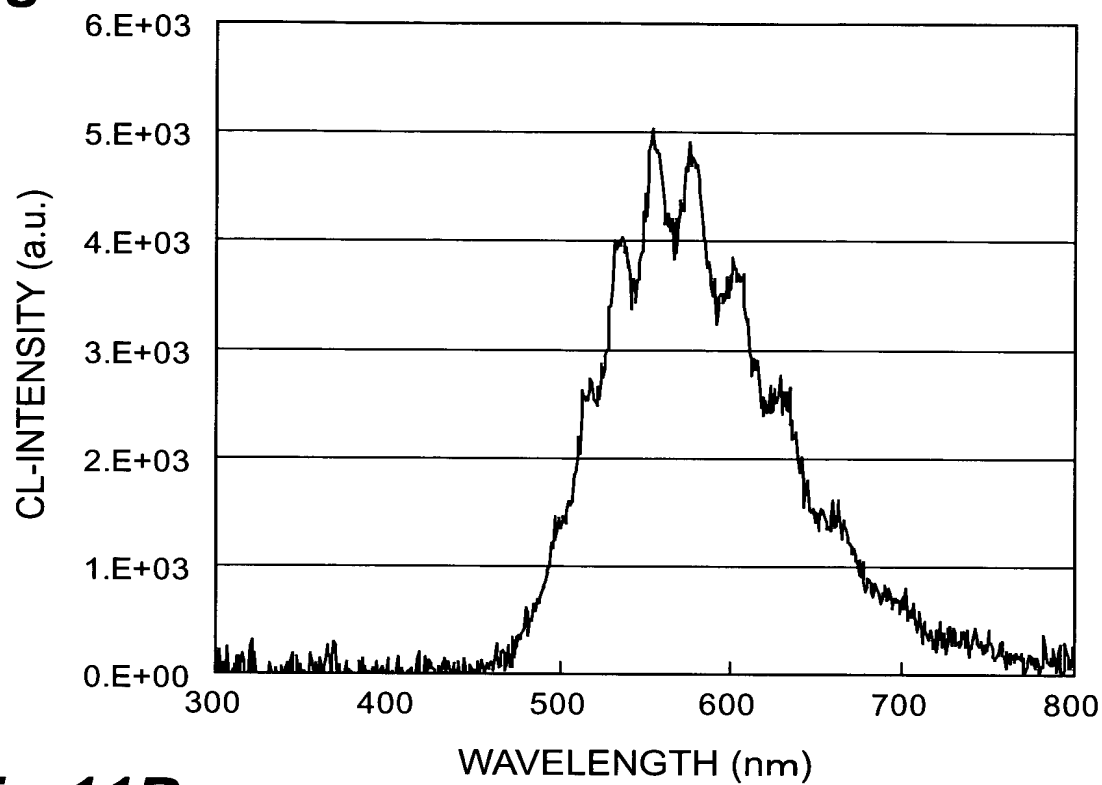
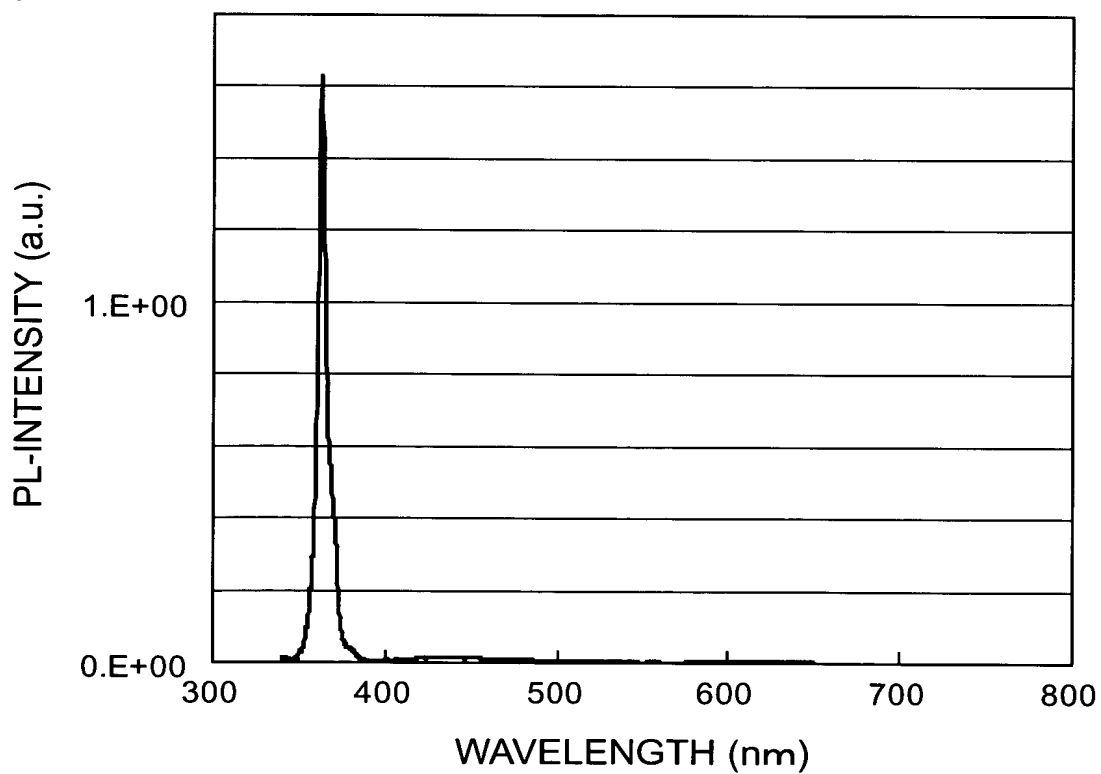
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Fig.9A**Fig.9B**

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Fig. 10A**Fig. 10B**

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Fig.11A**Fig.11B**

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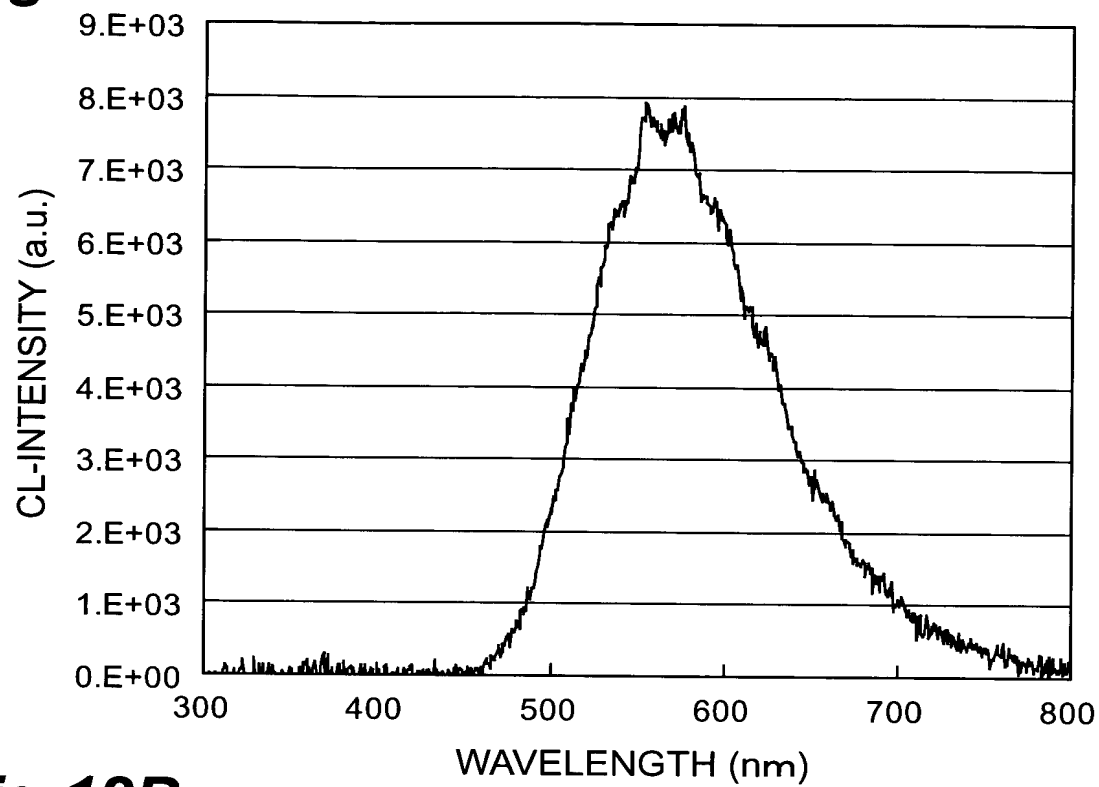
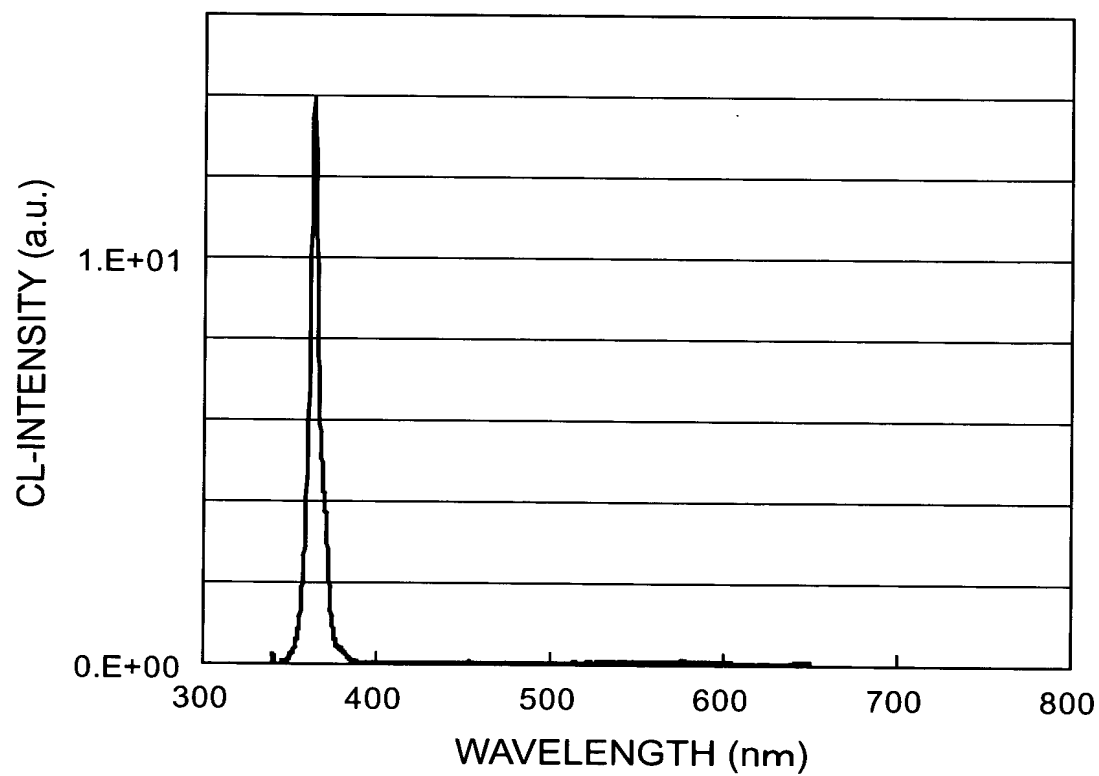
Fig.12A**Fig.12B**

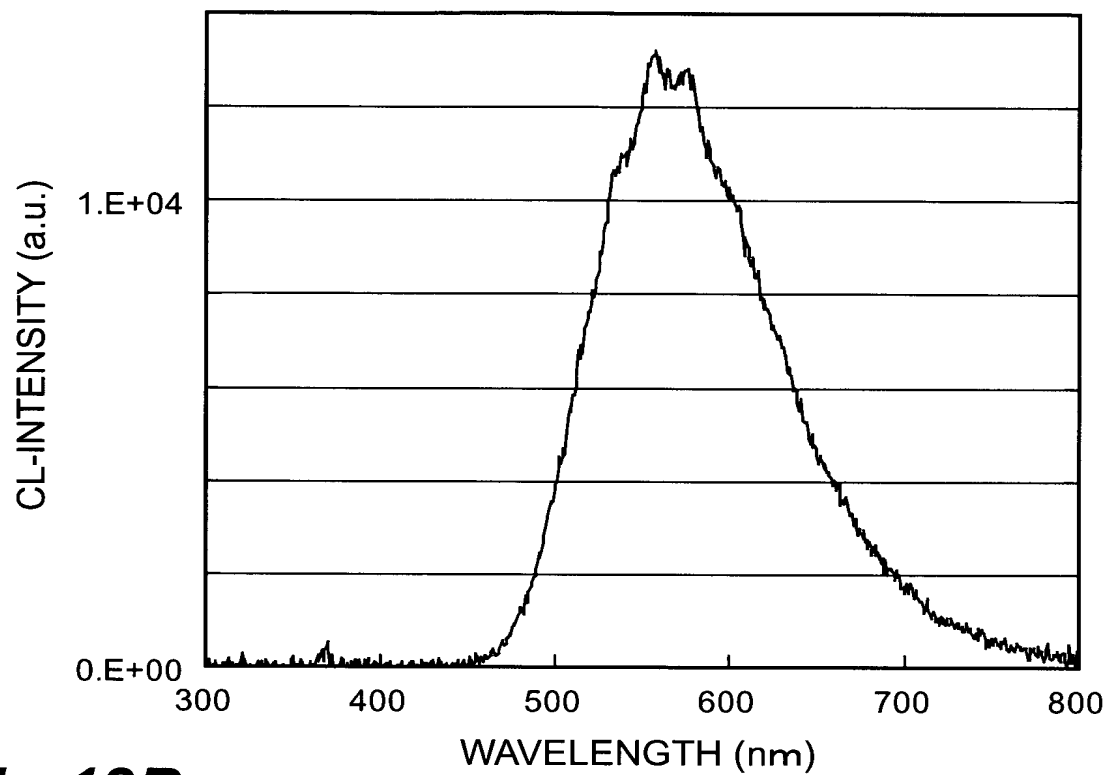
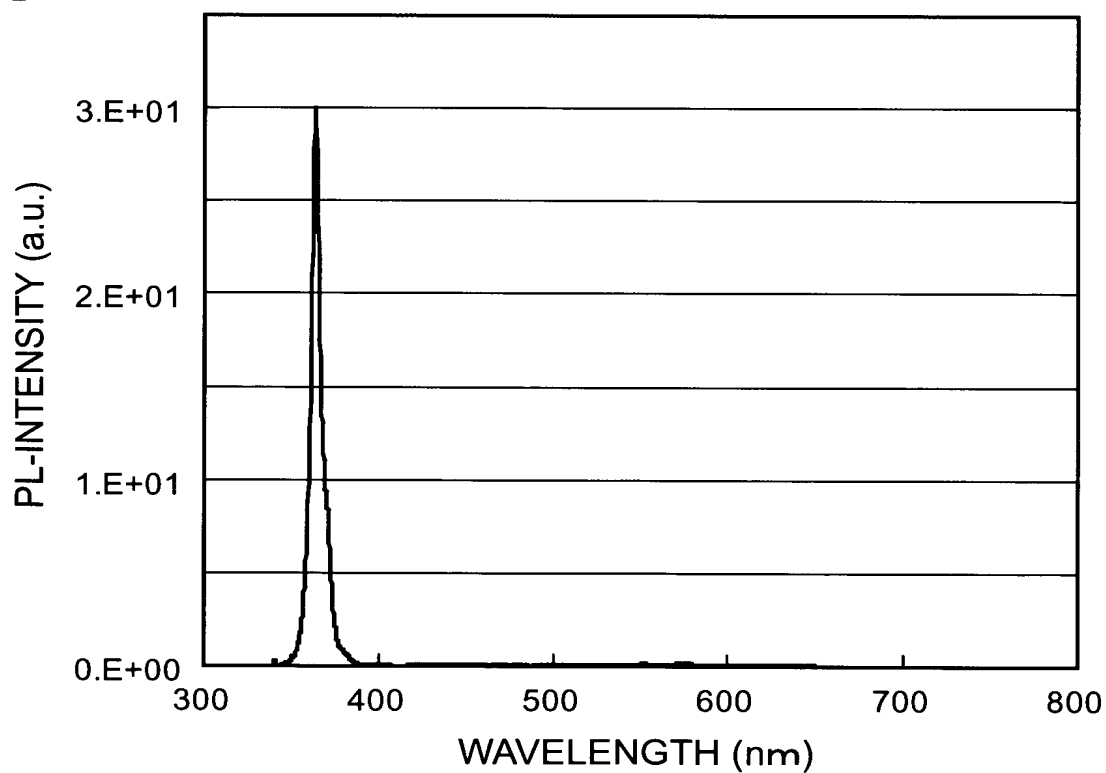
Fig.13A**Fig.13B**

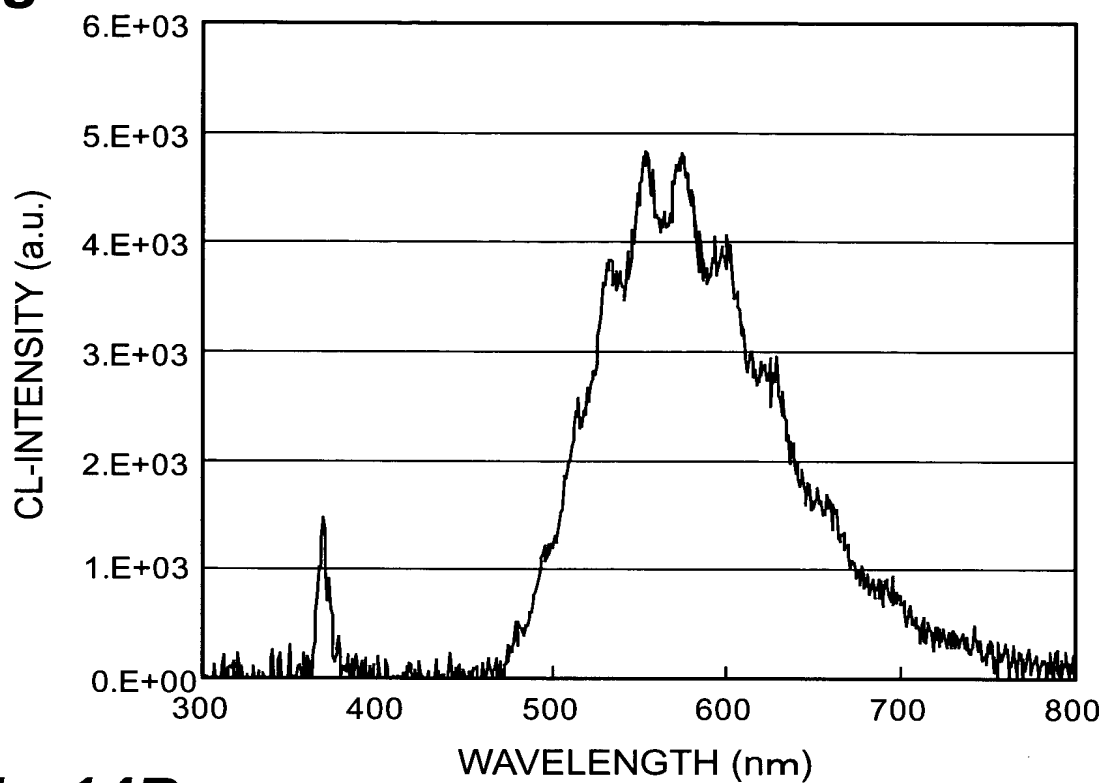
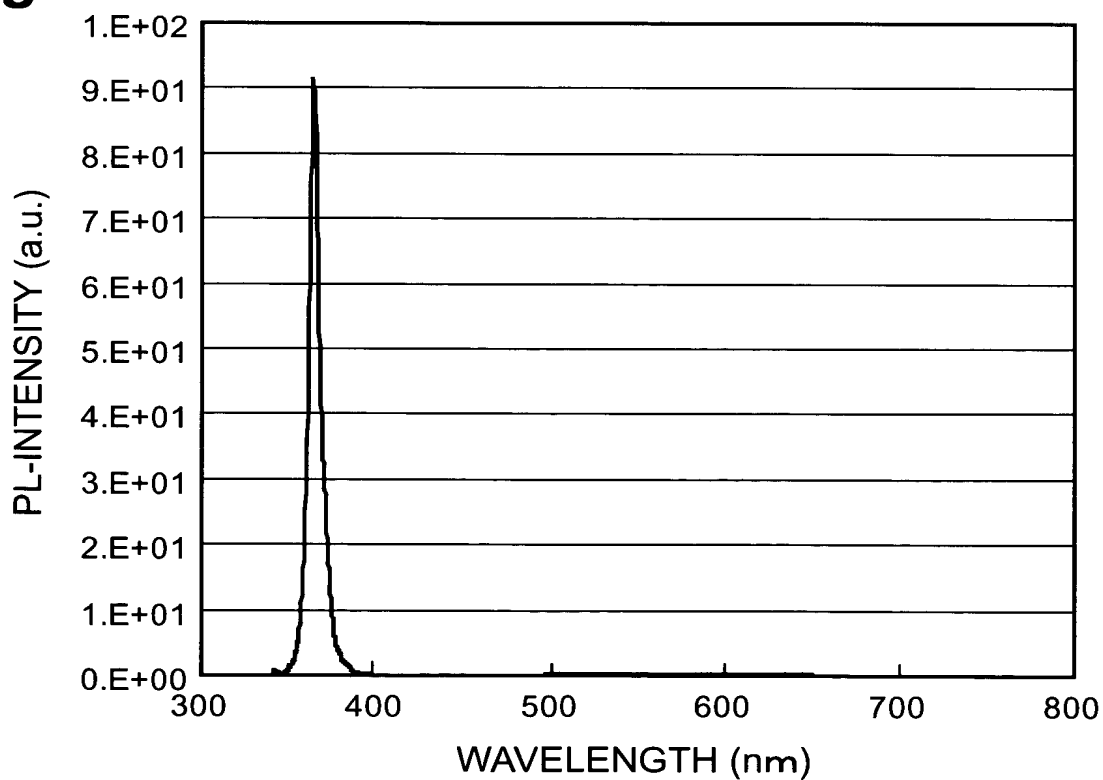
Fig.14A**Fig.14B**

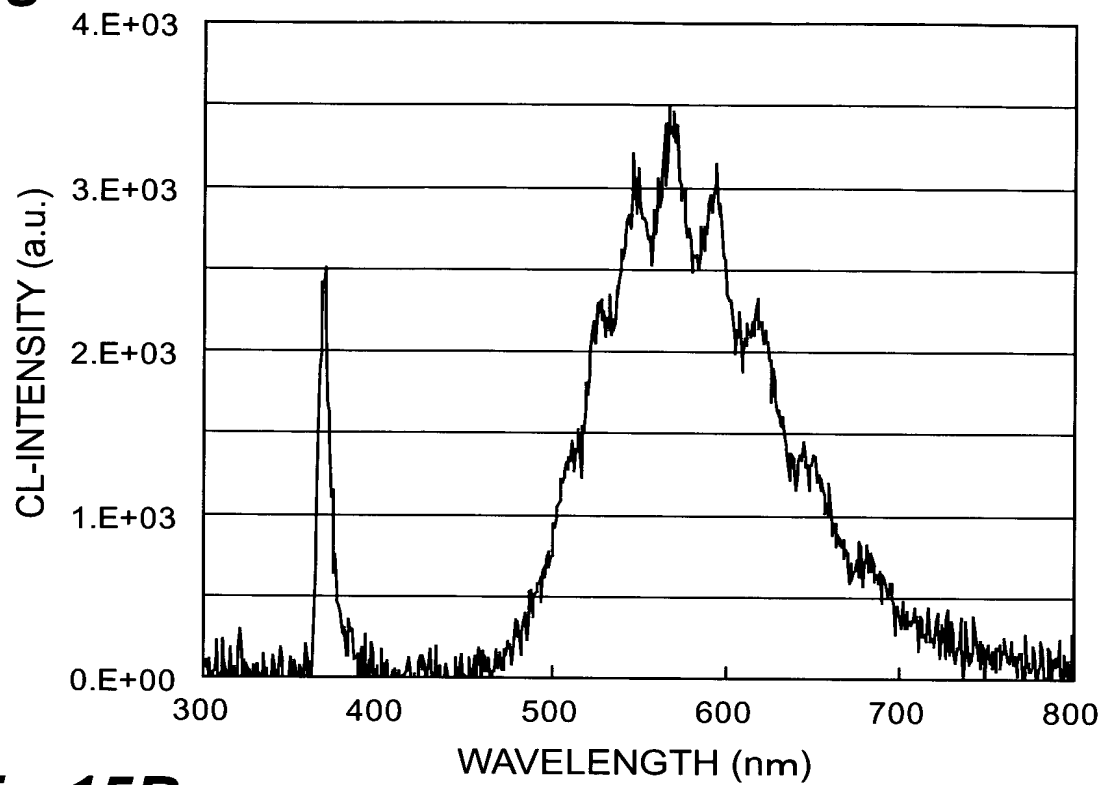
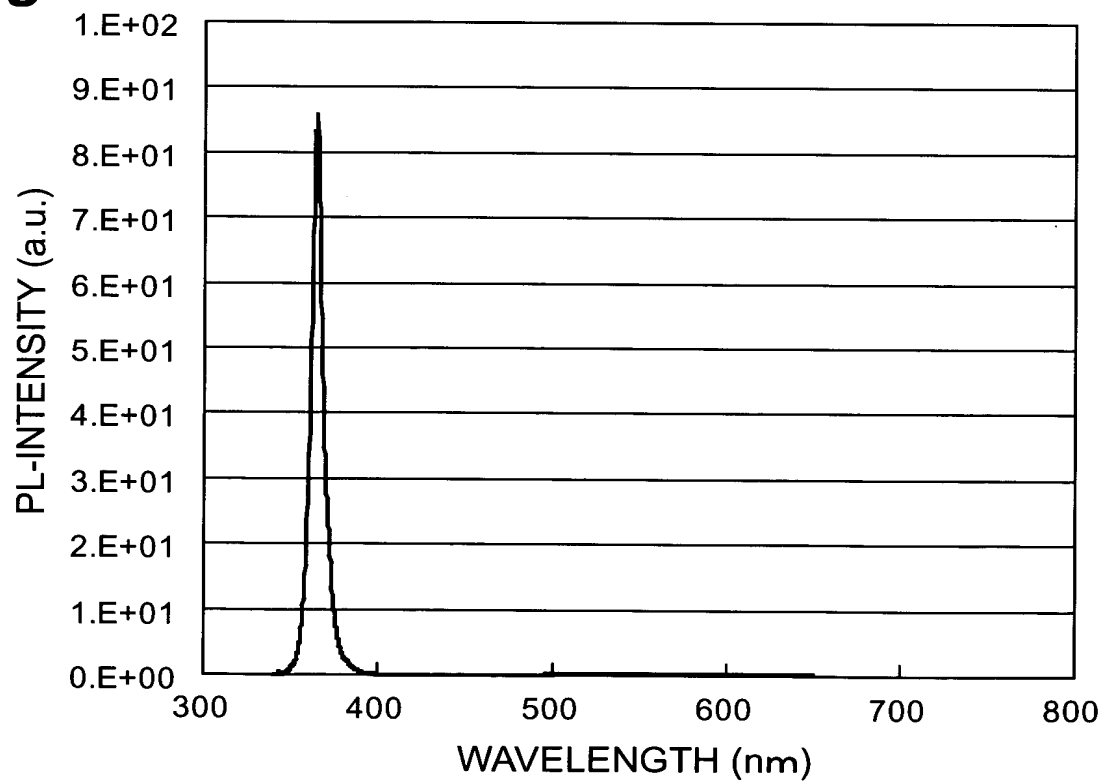
Fig.15A**Fig.15B**

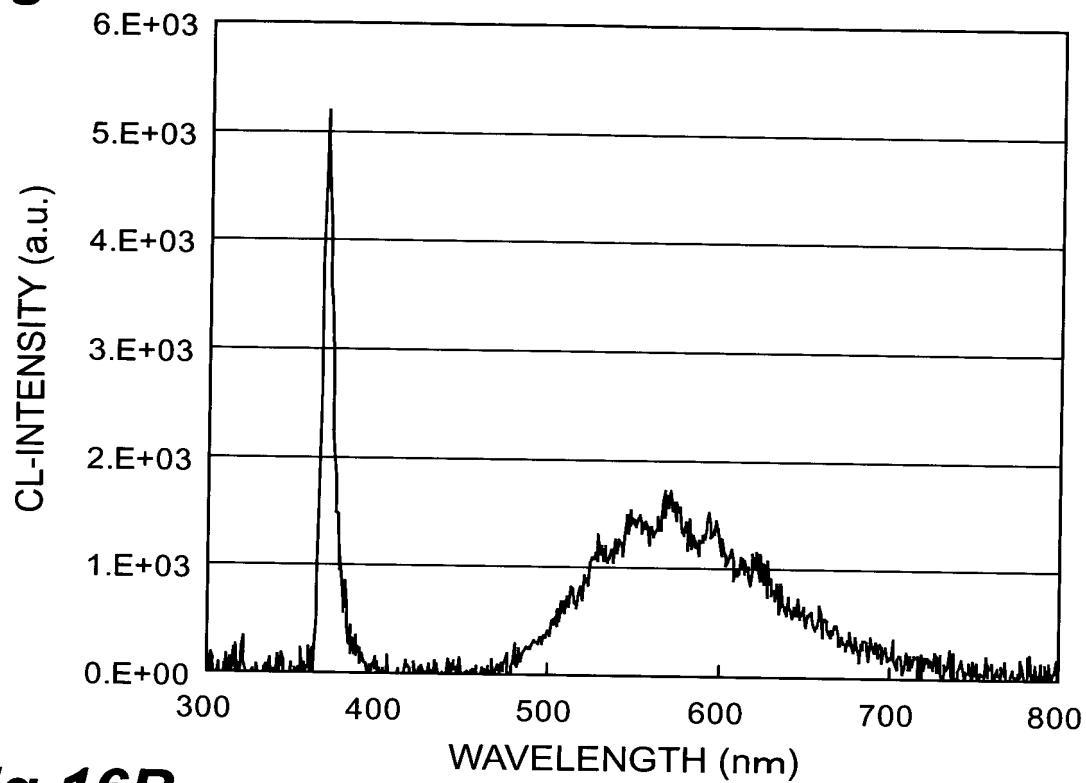
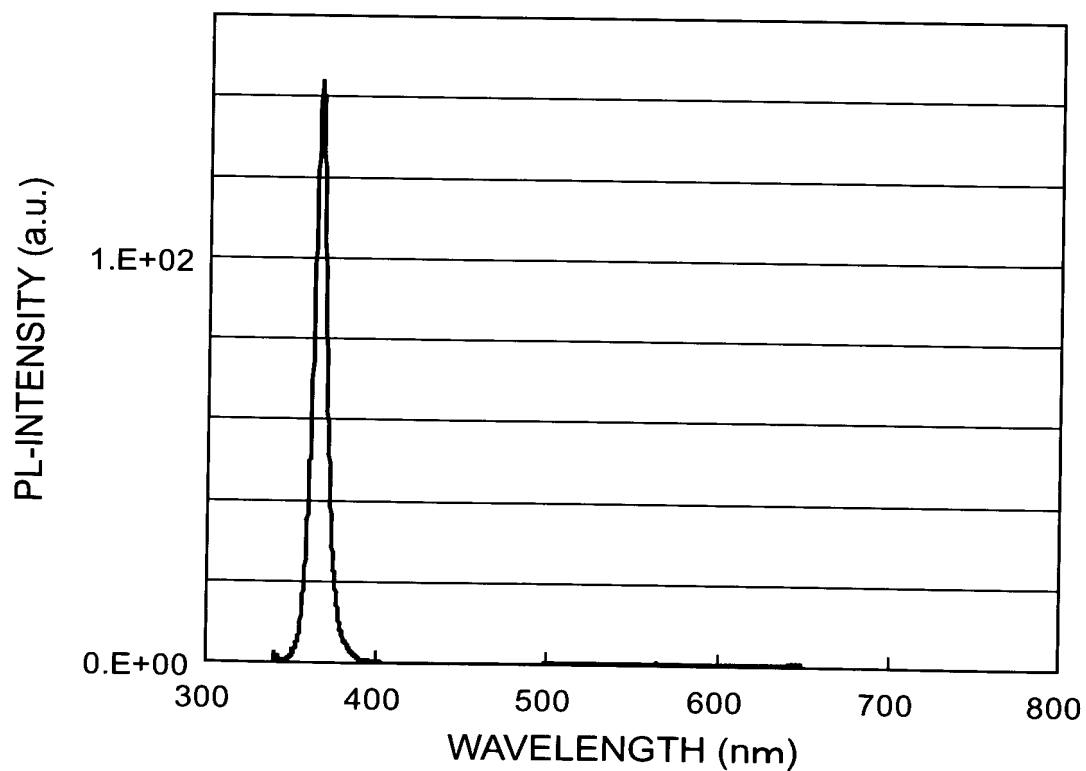
Fig.16A**Fig.16B**

Fig.17

	TOP LAYER	WELL WIDTH (nm)	BARRIER LAYER THICKNESS (nm)	In- COMPOSITION (x)	Si-DOPANT AMOUNT (cm ⁻³)
SAMPLE 1	InGaN/GaN (QUANTUM WELL STRUCTURE)	4	10	0.13	1.8×10^{18}
SAMPLE 2	InGaN/GaN (QUANTUM WELL STRUCTURE)	2	10	0.13	1.8×10^{18}
SAMPLE 3	InGaN/GaN (QUANTUM WELL STRUCTURE)	6	10	0.13	1.8×10^{18}
SAMPLE 4	InGaN/GaN (QUANTUM WELL STRUCTURE)	4	10	0.07	1.8×10^{18}
SAMPLE 5	InGaN/GaN (QUANTUM WELL STRUCTURE)	4	10	0.10	1.8×10^{18}
SAMPLE 6	InGaN/GaN (QUANTUM WELL STRUCTURE)	4	10	0.14	1.8×10^{18}
COMPARATIVE EXAMPLE 1	GaN (BULK STRUCTURE)	—	—	—	0
COMPARATIVE EXAMPLE 2	GaN (BULK STRUCTURE)	—	—	—	1.4×10^{17}
COMPARATIVE EXAMPLE 3	GaN (BULK STRUCTURE)	—	—	—	2.8×10^{17}
COMPARATIVE EXAMPLE 4	GaN (BULK STRUCTURE)	—	—	—	1.4×10^{18}
COMPARATIVE EXAMPLE 5	GaN (BULK STRUCTURE)	—	—	—	2.8×10^{18}
COMPARATIVE EXAMPLE 6	GaN (BULK STRUCTURE)	—	—	—	6.8×10^{18}

Fig.18

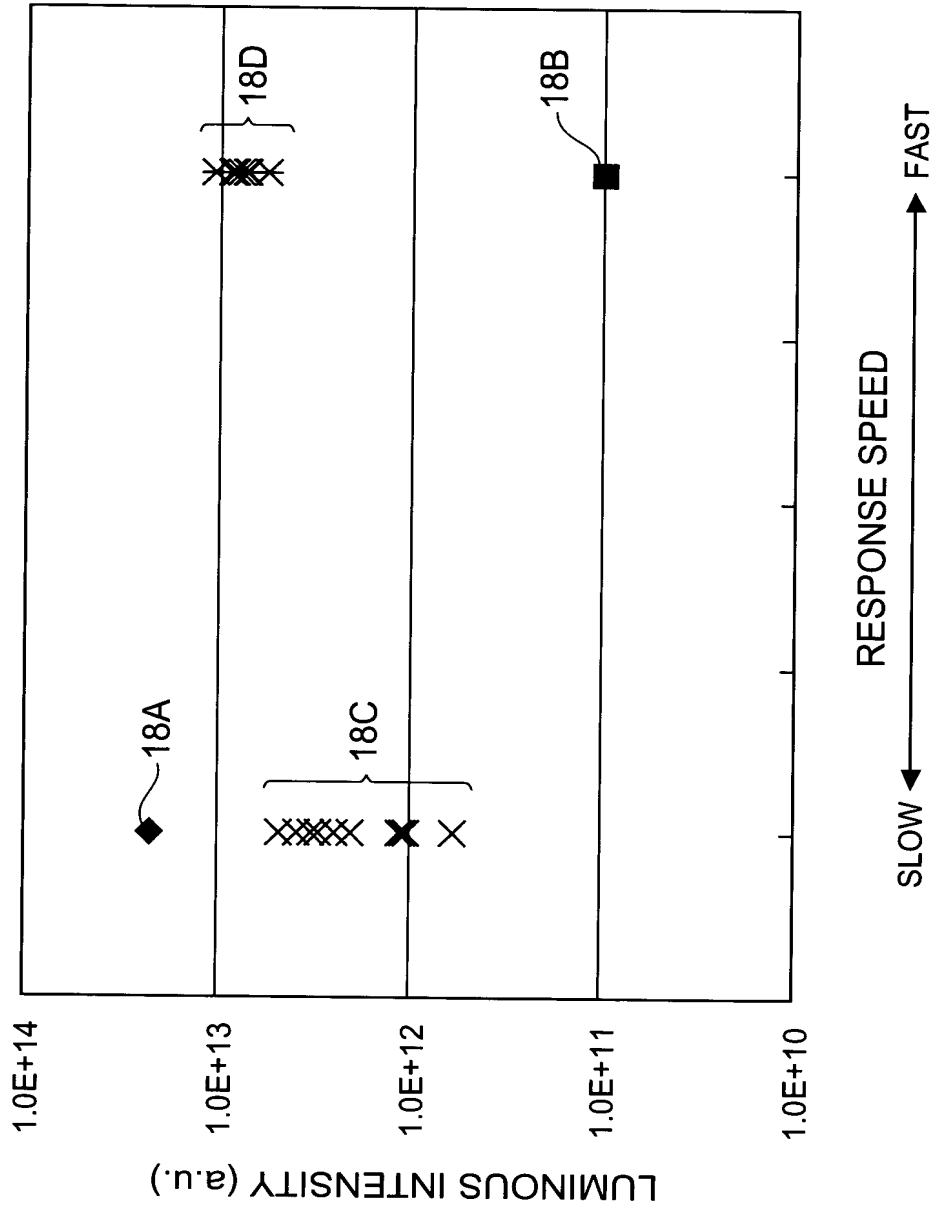


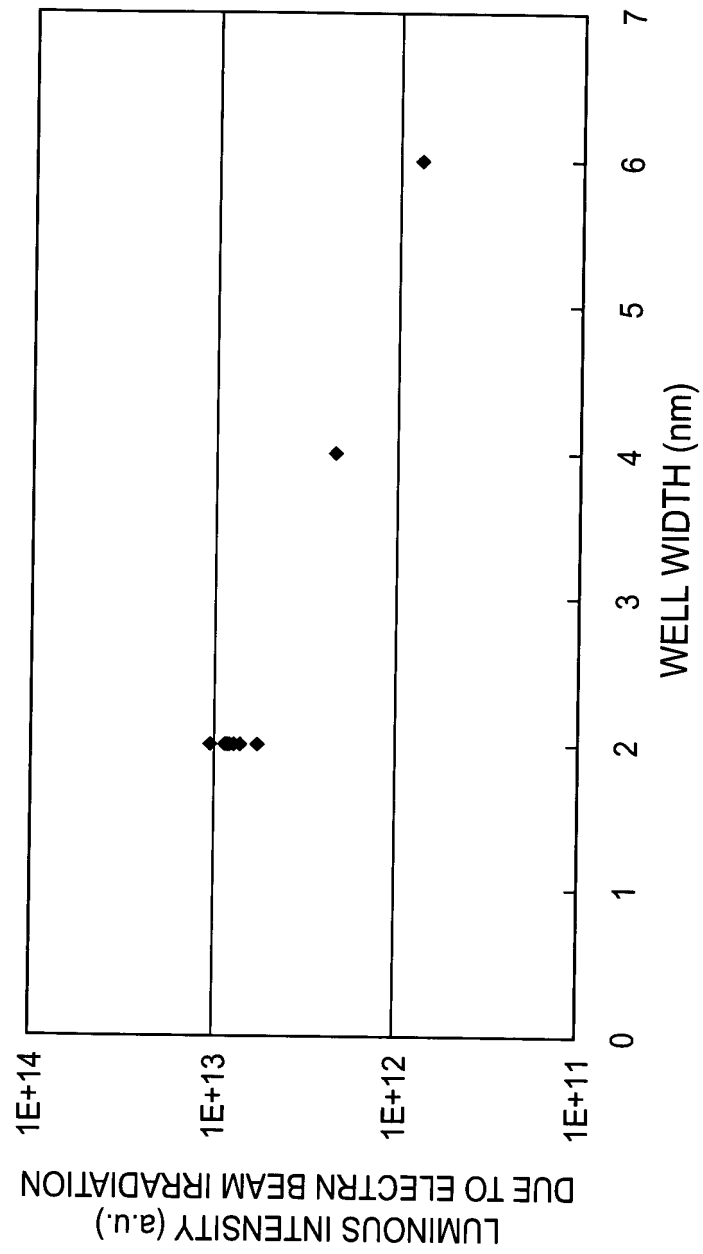
Fig.19

Fig.20

SUBSTRATE MATERTIAL	TRANSMISSION WAVELENGTH (nm)	(eV)
GaN	366	3.39
AlN	200	6.2
LiAlO ₂ (LAO)	191	6.5
LiGaO ₂ (LGO)	221	5.6
ZnO	368	3.37
6H-SiC	409	3.03
4H-SiC	380	3.26
α -Al ₂ O ₃ (SAPPHIRE)	170	—
MgO	200	—
MgAl ₂ O ₄	200	—

Fig. 21

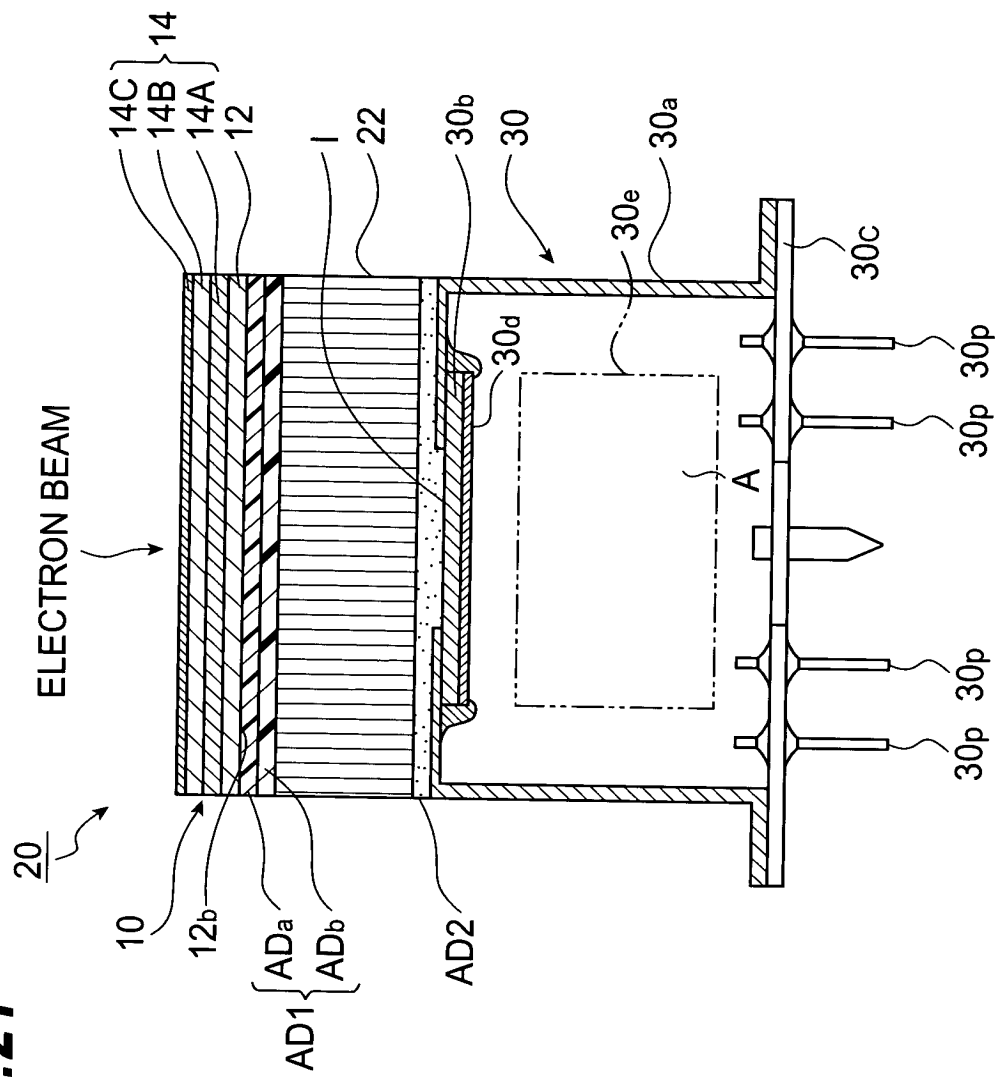


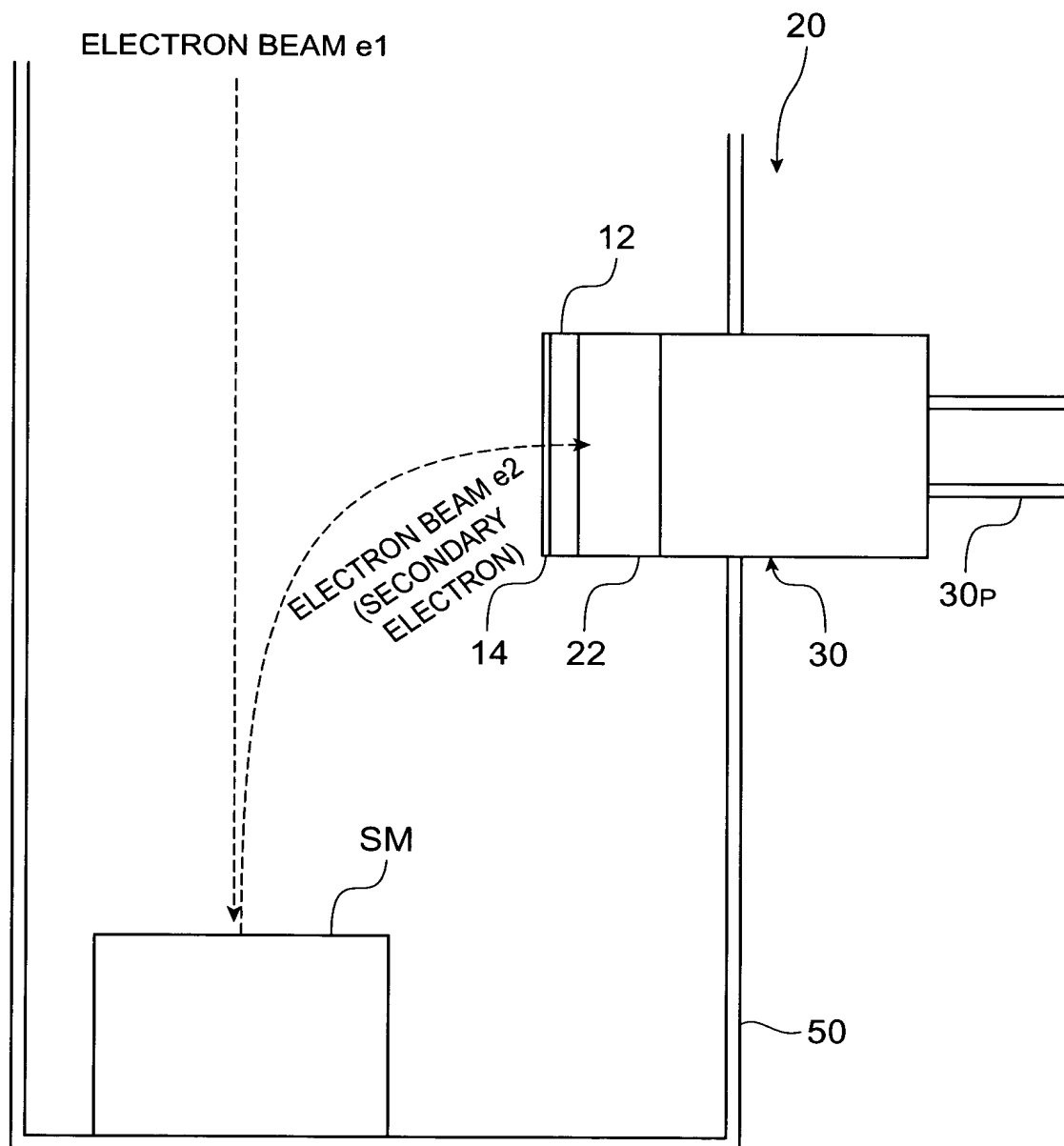
Fig. 22

Fig. 23

